Position Sensing Transition Edge Sensor (PoST) X-ray Imaging Spectrometer

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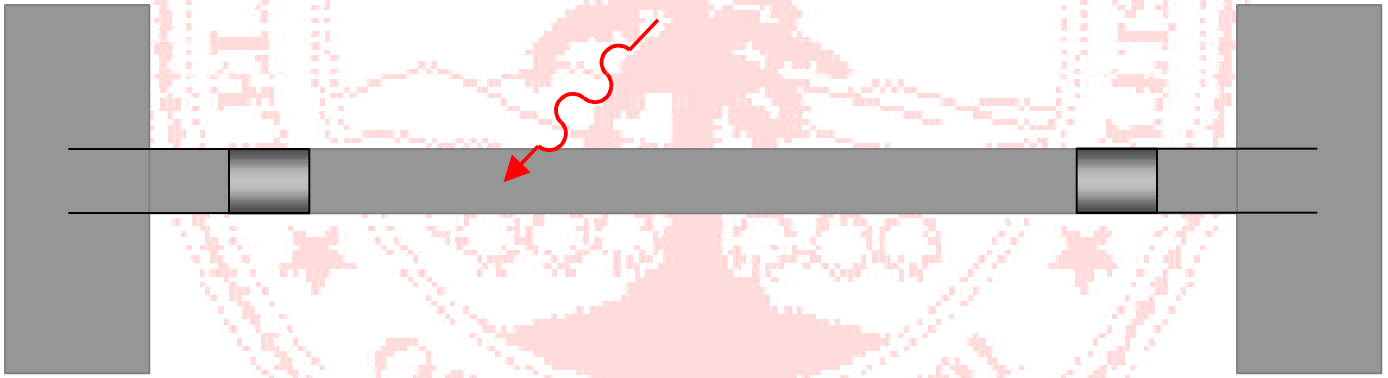


*Currently at GSFC

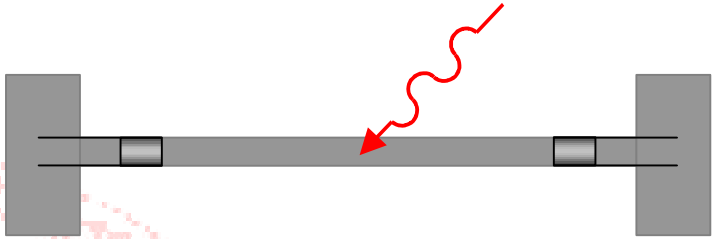
Why should we consider PoSTs?

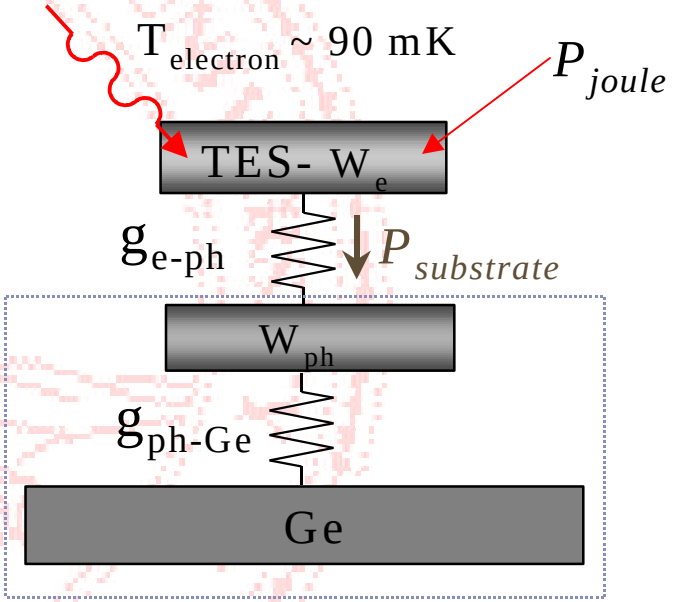
To increase focal plane area!

- With the Constellation-X 10 meter focal length, around 12’ of unvigneted sky are available
- Current 30X30 baseline will only have a 2.5’ FOV
- PoSTs provide another level of multiplexing beyond the SQUID MUX

Mode of operation

- Athermal phonon collection
- Thermal bottleneck is the electron-phonon decoupling
- Position is calculated from timing and energy partition
- Energy is summed integral of the two pulses





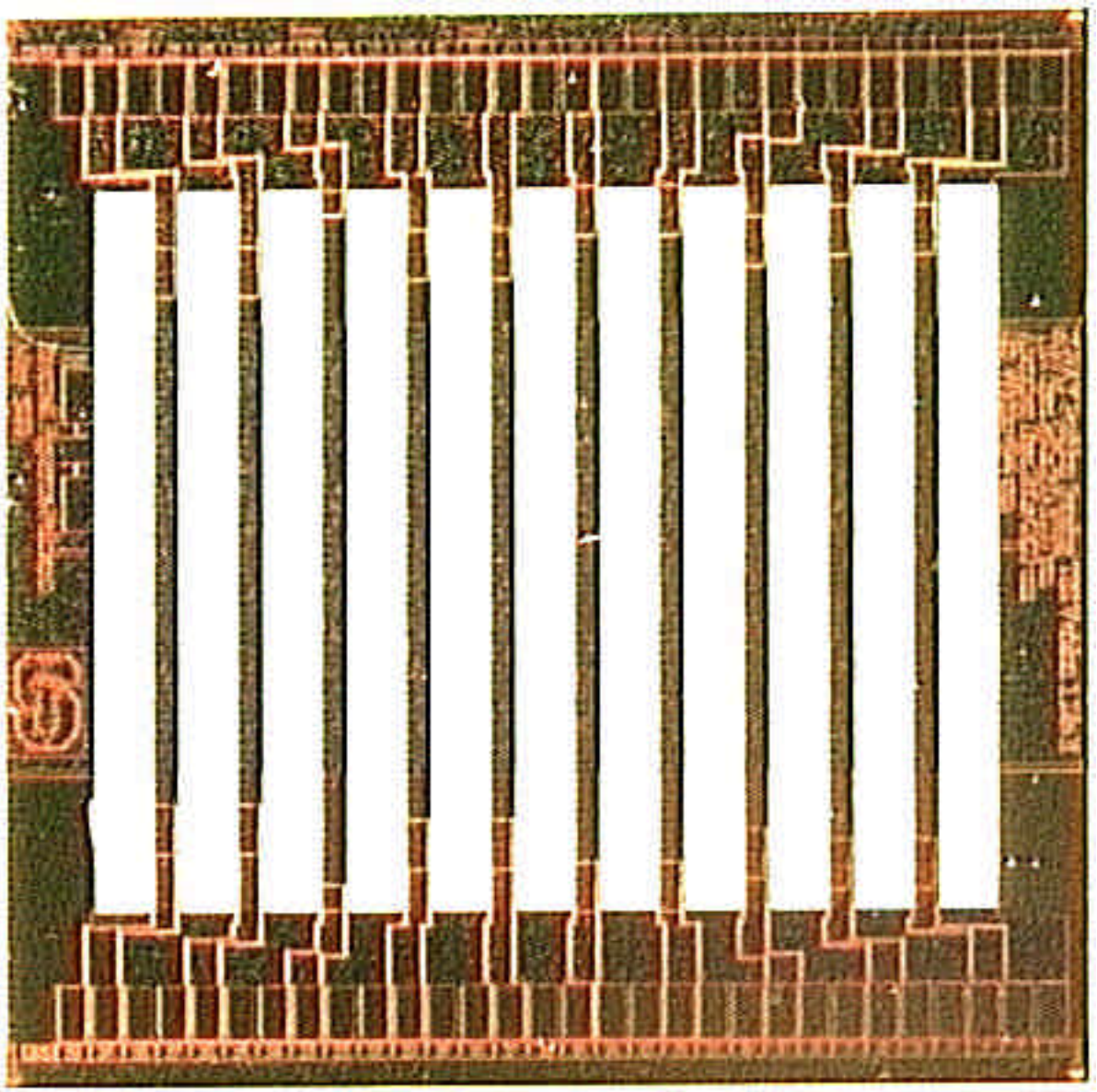
$g_{e\text{-}ph} \ll g_{ph\text{-}Ge}$

$T_{phonon} = T_{Ge} \sim 40$ mK

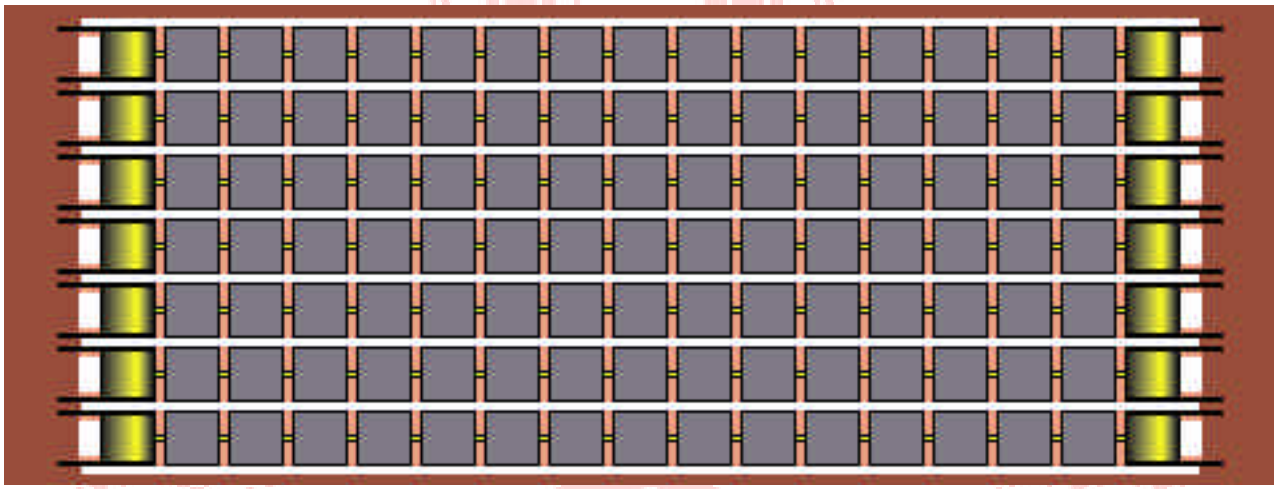
Challenges

- Maximum throughput decreases at least linearly with length of absorber
- Non-linear pulse shapes will require more complex data processing than a single pixel device
- Electron-hole pair recombination and good energy resolution need to be demostrated

First fabricated device



Goddard Mo/Au TES with Bismuth Absorber



- Mo/Au TES technology
- Pixellated absorbers
- Suspended in silicon nitride
- Offers large parameter space, since many factors can be tuned individually